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Darkness Falls Upon America's Backyard: An Evaluation of Central Appalachia's Past Economic Woes and a Blueprint for the Region's Future Economic Development

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Darkness Falls Upon America's Backyard:
*An Evaluation of Central Appalachia's Past Economic Woes and a Blueprint for the Region's
Future Economic Development*

by

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An Honors Thesis
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Problem Statement

The United States prides itself as a nation that offers equity and opportunity to its citizens. However, in recent decades, regions of relative wealth and poverty have come to define the American landscape. According to U.S. Census Data, coastal communities have fared well with consistently declining rates of unemployment and increasing rates of college graduation (U.S. Census Bureau, 2016; U.S. Census Bureau, 2018). In contrast, Central Appalachia, which comprises parts of Kentucky, Tennessee, Virginia, and West Virginia, continues to falter with diverging employment and income levels relative to other areas of the country. Central Appalachia's 7.3% unemployment rate is nearly 2 percentage points greater than the nation, and its household income is only 62% of the U.S. average (U.S. Census Bureau, 2017). Thus, this report's problem is motivated by left-behind Americans' plight in the face of hardening boundaries between coastal cities and rural areas.

Policy Question

Why do Central Appalachian counties continue to exhibit widespread poverty, whereas counties in other subregions, particularly northern Appalachian, demonstrate relatively high economic development levels (with a poverty level of 24% Central and 14.1% in North Appalachia) (U.S. Census Bureau, 2017)? In order to address this question, I will discuss the economic history of the region and consider three case studies, concentrated in McDowell, Harrison, and Chenango counties, to highlight both economically distressed and promising areas within Appalachia. McDowell County, located in southwestern West Virginia, has one of the nation's highest poverty rates and the nation's lowest life expectancy (I.H.M.E., 2016). By contrast, the economic transitions of Harrison County in West Virginia and Chenango County in New York provide a framework for developing a diverse Appalachian economy. Based on

findings from these case studies and a comprehensive literature review, I will conclude by proposing a research design to evaluate a place-based economic development initiative's success in ameliorating low economic outcomes.

The History of Appalachia

Overview

Appalachia comprises 420 counties across 13 states, spanning from southern New York to northern Mississippi (ARC, 2020). Twenty-five million Americans live within the region, 42% of which is considered rural. In 1963, at Appalachian governors' request, President John F. Kennedy formed the President's Appalachian Regional Commission to assess the region's needs. Citing 1960 U.S. Census data, the Commission published a report that nearly one-third of the area's population lived under the poverty line compared with about 1 in 5 nationwide. Indeed, the 1964 PARC report provided the basis for establishing the Appalachian Regional Commission (ARC) in 1965. The ARC, one of the most extensive place-based regional development programs, has since invested over \$4.5 billion into Appalachian communities with the principal goal of achieving socioeconomic parity with the rest of the nation. Federal, state, and local funding has matched this funding by more than \$10 billion.

Despite these significant expenditures, Appalachia still lags behind the rest of the nation. The divergence is particularly acute in the Central region, which contains Appalachia's most mountainous terrain (Baumann, 2006). The area historically relied upon extractive industries, including logging and coal mining, as important income sources. In fact, 33.8% of West Virginians in 1990 were employed in logging and mining, declining to 18.6% by 2020 (U.S. Bureau of Labor Statistics, 2020). Appalachian coal production and employment have faced decades of steady declines from a zenith in the 1940s, penalizing the pockets of the region

(primarily concentrated in eastern Kentucky and southwestern West Virginia) that relied upon the coal industry for employment (West Virginia Office of Mine Health and Safety, 2020). These declines became even more pronounced following the coal bust in the 1980s (Black, McKinnish, and Sanders, 2005): rural Central Appalachia's per capita household median income is now just three-quarters of the greater region's income and just over half of the nation's (U.S. Census Bureau, 2017). Whereas Appalachia's overall poverty rate decreased by 3 percent (on par with the country), the Central and North Central sub-regions endured a 2 percent increase from 2012 to 2017.

Perspectives on Appalachian Poverty

The broad economic literature on spatial heterogeneity across the United States often overlooks the Appalachian region, despite its large population and substantial divergence from the rest of the nation on several key factors. Since the mid-twentieth century, a smaller collection of Appalachian scholars has attempted to define the social, economic, and political factors contributing to Central Appalachia's "distressed" status. *Night Comes to the Cumberlands*, written by Harry M. Caudill in 1963, represents the first serious attempt at identifying the drivers behind the region's poverty; his work, in part, highlighted the importance of a place-based program to address the region's needs (Jaworski and Kitchens, 2019). He tells the story of an impoverished, unhealthy population, overwhelmed by outside businesses that extract Central Appalachia's rich coal resources and export them elsewhere (Caudill, 1963). Since his account of Appalachian poverty, other theories have arisen to identify the reasons behind the region's depravity.

Lohmann (1990) synthesizes these theories into several bodies of thought, three of which I will consider: "bureaucratic realism," "Appalachian culturalism," and "domestic colonialism."

Bureaucratic realism describes the public agency view, where Appalachia is a congressionally defined region requiring the same economic development policies as any other impoverished region. For instance, Empowerment Zones provide federal tax incentives and other financial benefits for businesses and workers located in certain areas (McDonald, 1997). The ARC “growth center” approach is another part of this strategy, where policymakers advocate for new highway corridors as a means of spurring growth (Lohmann, 1990).

Appalachia culturalism, on the other hand, purports that poverty in Appalachia cannot be overcome with development strategies that are applied to other areas of the U.S. Weller (1995) argues that Appalachian culture, concentrated in the Central Appalachian region, breeds residents with a unique complacency for isolation and poverty. He posits that general hopelessness creates a self-perpetuating cycle where young, uneducated parents birth more children than they can support, all of whom learn to subsist on government welfare. While Weller generalizes in broad strokes, others (Billings, 1974; Irelan, 1966) support the theory that Appalachian culture influences persistent poverty in the region. Although this report does not seek to analyze the psychological factors influencing Central Appalachia’s relative depravity, policymakers will need to consider the “Appalachian culturalism” theory when designing an effective place-based economic development policy.

Lastly, domestic colonialism views Appalachia as a colony within the United States, where rich natural resources are exported to other parts of the nation by outside firms with “maximum cost and minimum gain” to the state (Lohmann, 1990). This body of thought asserts that absentee ownership creates a vacuum that shapes the state’s economic institutions around too few industries; the demise of those industries, without notable replacements, thus deprives people of jobs. While I will attempt to understand the drivers contributing toward Central

Appalachian poverty, without a means of empirically proving one theory's veracity over another, I can only submit that the reality likely lies within a combination of the three approaches. However, I will emphasize the domestic colonialism concept, known more commonly as the "resource curse," as that has the most established precedent in the developmental economic literature (Auty, 1993). In doing so, I will analyze the history of coal mining in Central Appalachia and the implications of mining's prevalence on the region's outcomes.

Resource Curse: Literature Review

How can a region with plentiful natural resources experience such acute levels of poverty? One might expect that abundant raw resources would elevate an area's wealth level, encouraging investment and economic growth. The "resource curse," a phrase coined by Richard Auty in 1993, describes an area where resource wealth undermines that area's population's economic well-being. Sachs and Warner (1995) note that economies with abundant natural resources generally grow slower than economies with scarce resources. To test this theory, they analyze the relationship between resource intensity and growth. Sachs and Warner compare economies with high and low ratios of natural resource exports to GDP over nineteen years (1970-1989). Their evidence yields a significant negative relationship between resource intensity and growth, even after controlling for exogenous variables that may affect growth (e.g., per capita income). Acemoglu and Robinson (2012) offer further insight into this paradox by arguing that either inclusive or exclusive economic institutions can spur economic growth. Inclusive economic institutions encourage the free entry of business, secure property rights laws, and "opportunity" for most citizens. Such opportunities include a relatively level playing field to ensure that one interest does not crowd out the others. On the other hand, exclusive economic institutions are designed by powerful entities with the goal of extracting resources from other

economic agents. They further claim that these inclusive or exclusive economic institutions form symbiotic synergies with either pluralist (e.g., Norway) or absolutist political systems (e.g., Venezuela).

The developmental economic literature has increasingly considered economic complexity, resulting from interactions between multiple economic agents, as an essential driver of development (Hidalgo and Hausmann, 2009). Hidalgo and Hausmann (2009) assess country product associations by analyzing import/export data; they find a robust negative relationship between the number of products exported by a country and the ubiquity of those products (the number of countries exporting the same product). Their analysis also yields a strong positive correlation between export complexity and income per capita as well as future growth propensity. Although Central Appalachia no longer produces as much coal as it once did, the coal industry's past predominance as a major extractive agent can contextualize the region's present-day woes. According to the literature, areas that historically rely on a few extractive industries as a primary source of income constrain the on-the-job skills that area-residents acquire (Hausmann *et al.*, 2014).

On the other hand, an area with economic complexity affords workers a broader range of knowledge and, thus, employment opportunities: Hausmann *et al.*, (2014) draw a statistically significant positive relationship between cognitive ability and economic complexity. Moreover, Goetz *et al.*, (2019) identify a positive correlation between industry diversity and economic resilience in congruence with these findings, suggesting a community is likelier to overcome an economic shock if it produces a more diverse array of goods. Having established the importance of inclusive economic institutions that facilitate complex interactions between agents, I will

consider the history of coal mining in Central Appalachia, where coal remains the region's top export (U.S. Census Bureau, 2019).

Coal Mining in Appalachia

Coal mining has a particularly rich history in West Virginia, the only state located entirely within Appalachia. West Virginia is second only to Wyoming in U.S. coal production and accounts for 12% of total coal production in the U.S. (U.S. Energy Information Administration, 2020). The construction of railroads between 1880 and 1920 unbridled a period of significant transformation within Central Appalachia, transitioning the economic landscape from agrarian to capitalist modes of production (Nesbitt, 2019). During the early twentieth century, absentee-owned lumber companies advantaged from easy access to the railroad, killing most of West Virginia's virgin forests. With the exhaustion of Central Appalachia's timber resources, coal mining became the primary economic activity by 1920. The coal and railroad companies subsequently won land and mineral rights to 80% of southern West Virginia during the following decade. Rasmussen (1994) argues that this "insecurity in landownership" differentiated early twentieth century farmers from farmers elsewhere in the heartland. The farms in southern West Virginia, eastern Kentucky, and southwest Virginia were often replaced with company-owned coal camps (Eller, 1982). Unlike other parts of Appalachia and the Midwest, most miners—79% in southern West Virginia and 64% in eastern Kentucky/southwest Virginia—lived in such company towns by 1910. In addition to supplying miners with homes, the companies created all the necessary institutions to run the town (Lewis, 1993). Mine operators thus orchestrated the general store, church, post office, and entertainment establishments. This relationship continued into the late twentieth century. The Appalachian Land Task Force (1983) found that "for many Appalachian people, coal camp life is not a

bygone era. Facing no alternative, people remain, often dependent upon the will and wishes of the company landlord. In staying, they face insecurities of tenure, dilapidated housing, and fear of the company's power."

However, despite the industry's long-time association with the Appalachian region, coal mine employment has declined since the mid-twentieth century (West Virginia Office of Mine Health and Safety, 2020). Much like in other sectors, mine owners replaced employees with mechanized equipment, such as longwall mining machines, beginning in the 1950s. Whereas 125,669 West Virginians were employed as miners in 1948, only 19,432 of the population remained miners by 2013. Eastern Kentucky and southern West Virginia, an area once home to most Appalachian company towns, is now Appalachia's most distressed region (ARC, 2020). For example, McDowell County is one of the most impoverished counties in the country; in 1950, the area boasted a population of nearly 100,000 residents, dwindling to less than 20,000 residents by 2019 (Rudd *et al.*, 2016).

In addition to mechanization, several other factors can account for the industry's long-run downturn. The 1970s Organization of Petroleum Exporting Countries (OPEC) oil embargo increased coal's price, temporarily uplifting coal mine communities (Black, McKinnish, and Sanders, 2005). However, by 1983, oil prices declined significantly, reversing the boom's effects; the devastation was coupled by Western coal mines that further mechanized mining techniques, driving down coal costs. Black, McKinnish, and Sanders (2005) evaluate the spillovers generated by coal jobs in Central Appalachia and find that one mining job during a boom yields 0.174 local jobs. The loss of one mining job during a bust erases 0.349 local jobs. The coal industry's death knell has nearly been cemented over the last decade because of cheaper substitutes and market saturation. After coal consumption and production peaked in the U.S. at

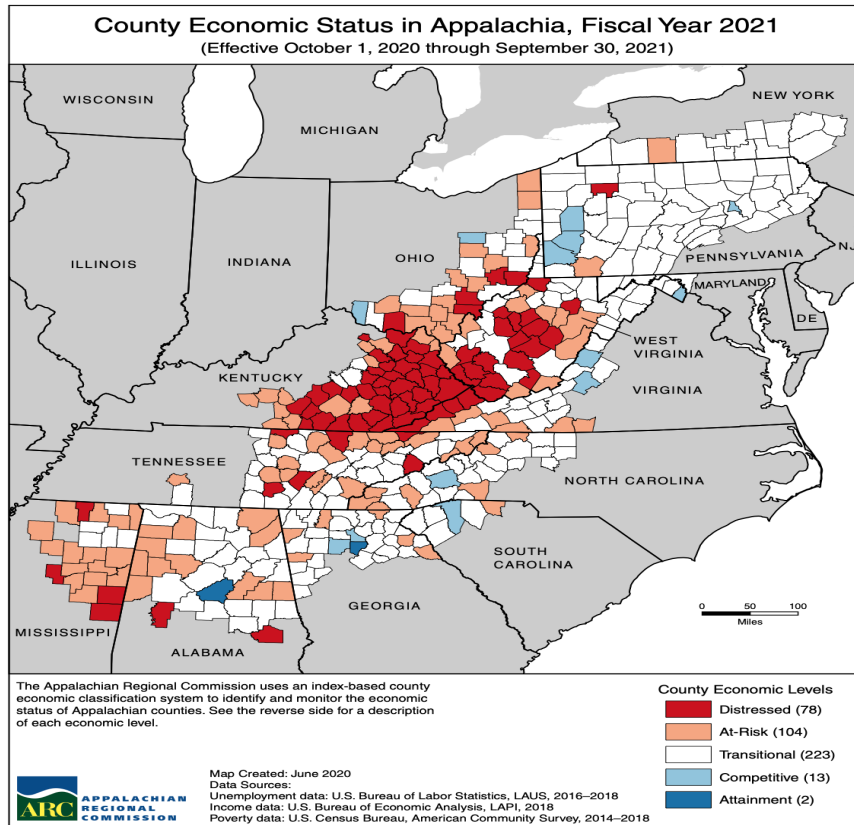
1-1.1 billion tons in 2007, consumption declined to 650 million tons by 2017 (Mendelevitch, Hauenstein, and Holz, 2019). The proliferation of natural gas between 2007 and 2017, where production increased by 45%, significantly decreased natural gas prices as an energy source. Likewise, the share of renewable forms of electricity generation increased from 2.5% to 10% during that period, as preferences shifted from coal in favor of solar and wind sources. Furthermore, mine companies' speculation regarding skyrocketing Asian demand encouraged investment in costly, new assets, resulting in the overproduction of coal. The subsequent market saturation bankrupted both large and small firms operating in Appalachia. 50% of mining jobs in the region vanished between 2011 and 2016.

The Current State of Appalachia

Overview

To assess economic fortitude, the ARC relies upon an index-based classification system with five different designations: distressed, at-risk, transitional, competitive, and attainment (ARC, 2020). Three indicators inform these designations: three-year average unemployment rate, per capita market income, and poverty rate. As demonstrated by figure I., almost all Central Appalachian counties are either distressed (among the worst 10% in the nation) or at-risk (between 10% and 25% worst in the nation). None have reached attainment (ranking in the best 10%), and only two have achieved a competitive status (between 10% and 25% best in the nation).

Figure I.



Source: Appalachian Regional Commission (2020)

Several key characteristics differentiate Central Appalachia from other impoverished parts of the nation. For instance, before the ARC’s establishment, a large portion of Appalachia was geographically isolated from the rest of the Eastern Seaboard. The formidable mountainous terrain retarded easy access to the area’s cities and towns. Indeed, Redding and Venables (2004) test for the effect of geographic isolation on trade, equity flows, direct investment, and technology. They find that the aforementioned economic interactions decrease with distance, finding that clustering facilitates economic growth. The 1964 PARC report concluded that, “developmental activity in Appalachia cannot proceed until the regional isolation has been overcome. Its cities and towns, its areas of natural wealth and its areas of recreations and industrial potential must be penetrated by a transportation network which provides access to and

from the rest of the Nation and within the region itself” (PARC, 1964). The ARC hence designed the Appalachian Development Highway System—a now-3,090 mile-long network of roadways, comprised of Interstates and state routes—to mitigate Central Appalachia’s isolation (Jaworski and Kitchens, 2019). The new highway system replaced the narrow, meandering and ill-maintained two-lane roads that provided the only means of travel from town-to-town. Jaworski and Kitchens (2019) examine the efficacy of the ARC’s infrastructure initiative by comparing income data for ARC and bordering non-ARC counties. They estimate a counterfactual scenario where the fall in trade costs equates to about \$54 billion without a highway system. While the issue of geographical isolation has at least been partially addressed with targeted development policy, more foundational problems remain.

Appalachia is notable for its low labor force participation rates, which mask the severity of unemployment relative to the rest of the nation. Central Appalachia’s unemployment rate in 2017 stood at 7.3%, slightly higher than the U.S.’ 5.4% unemployment rate (U.S. Census Bureau, 2017). However, while the nation’s average labor participation rate is 63.9%, West Virginia’s is the lowest in the nation at 52.9% (U.S. Bureau of Labor Statistics, 2020). Central Appalachia also diverges from the rest of the nation in educational attainment. 22% of area residents lacked a high school diploma (compared to 12.7 in the U.S.), and only 13.8% achieved a bachelor’s degree or higher (in contrast with 30.9% in the U.S.) (U.S. Census Bureau, 2017). While the resource curse explanation contextualizes the current state of poverty in Appalachia, it offers an incomplete picture of factors that describe the present-day situation. High out-migration (particularly of young, educated residents) as well as low labor force participation characterize critical issues that the region must address in order to spur sustained, intensive economic growth.

Appalachian Migration Trends

The Appalachian Region's net migration rate was negative during the 1980s, fueled in part by deindustrialization and the transition to capital intensive technology (McLaughlin *et al.*, 1999). Deindustrialization primarily affected the Northern sub-region, whereas the technological shift impacted the Central sub-region by reducing employment and wages in mining areas. In fact, Central Appalachia experienced the region's weakest growth at -1% per year through the late 1980s. The greater Appalachian region endured a negative net-migration rate of 410,000 residents during this period (Litcher *et al.*, 2005). However, upon closer analyzation of county-level data, the spatial heterogeneity of the region becomes apparent. The Southern sub-region demonstrated relatively strong growth, primarily in suburban counties that border growing metropolitan areas, including Atlanta, Asheville, and Spartanburg. Conversely, the counties defined as Transitional and Distressed by the ARC generally witnessed rapidly declining populations. Only 30% of these areas witnessed net in-migration from 1980 to 1989. Furthermore, merely 18% of rural counties (not connected to urban or suburban counties) experienced net in-migration.

Out-migration from Northern and Central Appalachia notably occurred across specific age and education demographics. From 1985 to 1990, adults aged 25 to 39, key members of the prime-age demographic, moved away in greater numbers than those of the same age group who moved to the two regions (McLaughlin *et al.*, 1999). Those aged 75 and over also left the Northern and Central Appalachian areas; only the 55 to 64 age group demonstrated a net in-migration rate. On the contrary, the Southern sub-region witnessed growth across all groups. In particular, metropolitan counties in Georgia, especially those in the Atlanta area, attracted the region's highest net in-migration of aged 25 to 39 individuals.

The Northern and Central regions also suffered from net-losses in college graduates, though the Northern area was more successful in retaining those with high school diplomas. Distressed and Transitional counties lost college educated residents, whereas competitive counties gained 17 college-educated residents per 100 people between 1985 and 1990. As has been discussed, these distressed counties are primarily located in Central Appalachia; in fact, .74 per 100 people with college degrees left the Central Appalachian area during this period. However, all regions experienced an in-migration of individuals with less than a high school diploma.

While population growth improved somewhat in the following decade, this growth was primarily driven by the Southern sub-region (Litcher *et al.*, 2005). Northern and Central Appalachia demonstrated positive, albeit small, growth rates of .06% and .54%. By the early 2000s, this promising milieu dissipated, with Northern Appalachia again demonstrating negative population growth and Central Appalachia experiencing a growth rate of only .2%. This downward trend has continued into the twenty-first century. From 2010 to 2016, the Central Appalachian Region bore the weakest population growth at -2.2% with the Northern sub-region following at -1.8% (Pollard *et al.*, 2018). Rural Appalachia (all Appalachian counties non-adjacent to metropolitan areas) witnessed the most staggering decreases, losing 1.7% of its population from six years prior.

This geographic sorting across age and education demographics is supported by the labor market and economic development literature. Zaiceva (2014) analyzes patterns from global and U.S. studies to assess the relationship between aging and migration. She finds a negative relationship between aging and migration once workers are over 30 years old. She suggests this to be an important discovery, given that when individuals in the 20 to 30 year old age group

migrate away, regions tend to lose their most productive workers. Whitaker (2019) studies U.S. Census data, observing that younger cohorts, specifically the millennial generation (born from 1980 to 1996), flowed from nonurban to urban areas on net from 2000 to 2015. Urban populations have risen largely because the growth in millennial population has occurred as more seniors choose to age-in-place; over time, this has led to greater stratification of age groups across rural (older) and urban (younger) areas. Consistent with these findings, more rural Central and North Appalachia have higher median ages (41.8 and 42.6) than the U.S. as a whole (38) (Pollard *et al.*, 2018). Large Appalachian metros boast a median age of 39.5, more consistent with U.S. metrics.

Berry and Glaeser (2005) analyze migration data across the U.S. from the 1970s, 1980s, and 1990s. They find increasing regional segregation by skill with college-educated individuals concentrating in metropolitan areas. Glaeser and Saiz (2004) identify important implications to increasing a locality's human capital, namely substantial income and population growth. On the other hand, low-skilled worker in-migration has declined over time to metropolitan areas, which Austin *et al.*, (2018) attribute to more inelastic housing supply. Increasing housing costs in these urban areas, therefore, may contribute to the hardening boundary between low-skill and high-skill areas. The lack of meaningful economic development and job growth likely play critical roles in compelling younger, more educated workers, who can afford these housing costs, to leave the Central Appalachian region.

Appalachian Labor Force Participation

Abraham and Keary (2018) conclude that labor-demand factors contribute to the heterogenous nature of nonemployment rates for U.S. counties. For instance, they identify foreign competition and technological advancement as factors that led to declining prime-age male labor

force participation rates during the early 21st century. Furthermore, Austin *et al.*, (2018) study changes in wages and in male nonemployment rates at the public use microdata area (PUMA) level (1980 to 2010), finding a strong negative correlation between wage growth and male nonemployment. In particular, they observe that PUMAs with rising nonemployment have endured significant average wage declines over time. Consistent with this observation, Central Appalachia suffers from historically low income growth. In 2018, the region lagged behind the national average by 4 percentage points (1.8% versus 5.8%) (Pollard *et al.*, 2018). Baumann (2006) assesses the historic Appalachian wage gap and concludes that increasing returns to college degrees in the 1980s coupled with low regional educational attainment account for the widening gap between Appalachia and the nation. Indeed, Austin *et al.*, extrapolate that 1980 education data (the percent of male residents with high school and college diplomas) can account for 34% of the variation in 2010 male nonemployment across PUMAs, where less educated areas demonstrate higher nonemployment. When controlling for individual and historical area education level, the nonemployment gap between the Eastern Heartland (which encompasses Appalachia) and the coasts disappears. The relatively low wage growth and education levels of Appalachian adults, therefore, may frame the region's weak labor force participation rate.

Low labor force participation is hardly a new problem in Central Appalachia. In 1990, the number of non-participant Central Appalachian males (over 16) was 12.2 percentage points higher than non-participant males in the rest of the U.S. (Rogers, 1990). According to 2000 data, Central Appalachian labor force participation diverged from the nation by more than 3%. ARC-defined "distressed" counties had particularly low labor force participation rates, which fell below the national average by over 12% (Carrozza, 2004).

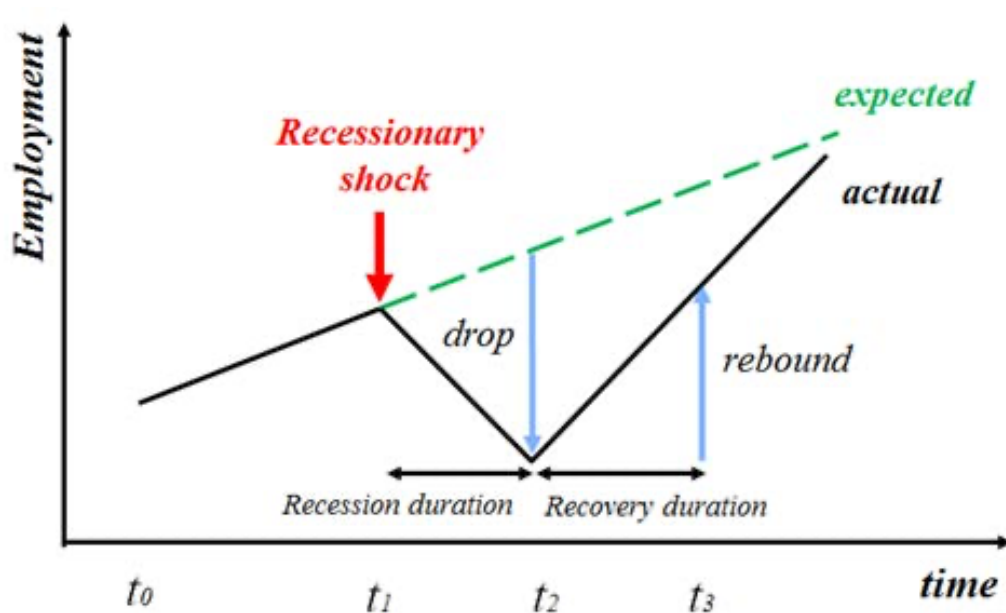
While labor force participation has declined nationwide, especially among prime-age men following the Great Recession, low labor force participation persists in Central Appalachia (Austin *et al.*, 2018). Economists frequently debate the drivers behind declining labor force participation rates; the two primary schools of thought can be characterized by what James Bullard (2014), chair of the St. Louis Federal Reserve Bank, describes as the "Bad Omen" view and the "Demographics" view. The "Bad Omen" literature portends that declining labor force participation will affect future U.S. macroeconomic performance because workers are frustrated with the economy. Conversely, the "Demographics" literature argues that as the U.S. population ages, especially as members of the Baby Boomer generation retire, the labor force participation rate will change to reflect these demographic adjustments. When performing the case study analysis, I will consider how accurately these views describe Central Appalachian counties.

Appalachian Case Studies

I will now examine three case studies to evaluate the developmental issues endemic to the Central Appalachian region and how those issues can be surmounted. Data collected by Han and Goetz (2015) guide my selection of distressed and “resilient” counties. The index calculates resilience as a measure of economic decline relative to expected employment and the subsequent recovery (if any) relative to the point of lowest employment after the shock (see figure II.). Expected employment is the region’s long-run growth trajectory at the onset of a recessionary shock. Additionally, Han and Goetz’s index assesses a county’s ability to reject and recuperate from an economic shock, using data from the 2007-2009 downturn. The first case study, McDowell County, demonstrates low economic resilience (declining with no recovery). In contrast, Harrison County in West Virginia (North Central Appalachia) and Chenango County in

New York (Northern Appalachia) exhibit relatively high regional resilience scores of .794 and .75, respectively, which are among the ten highest in Appalachia (Goetz *et al.*, 2019).

Figure II.



Source: Han and Goetz (2015)

Distressed County Case Study: McDowell

Background

McDowell County, a rural, mountainous area, is located in the coalfields of southern West Virginia (U.S. Census Bureau, 2010). Welch, the largest town in the County, is only accessible by a two-lane state roadway, like every other area-town. Coal mining has long been the primary source of economic activity in the County, with about 19.62% of the working population still employed as coal miners in 2012 (West Virginia Office of Mine Health and Safety, 2020). The industry's importance to the area's economic landscape can be traced to the 1880s. Pocahontas Fuel Company and U.S. Steel, recognizing southern West Virginia's high-quality coal, established mines and mining towns in the area by acquiring land and mineral rights

to thousands of acres (Moore, 1998). By the 1980s, energy and steel companies owned 86% of County land with mineral resources. In 2011, four companies controlled land rights to more than 50% of all private land in McDowell County, offering some credence to the absentee ownership “Domestic Colonialism” hypothesis (West Virginia Center on Budget and Policy, 2013).

Economic hardship and social upheaval have come to define McDowell County; despite that, some residents remain resolute in their commitment to the County’s economic development, claiming a strong sense of regional identity. Marsha Timpson, the executive director of a local community service non-profit, states, "Our coal forged the steel that built the nation. . .I am very connected to these mountains. This will always be home" (Sheldon, 2013). She likens Central Appalachia to America’s backyard, the area where one accomplishes necessary but, at times, unpleasant hard-work. However, not all residents look favorably upon the region’s coal industry. Ellis Ray Williams, a retired educator and principal, recounts his advisor at West Virginia University telling him to avoid settling in Welch because the economy relied on one industry. Williams believes that the region’s politicians have capitalized too long on supporting coal mining without incentivizing the development of auxiliary industries. He concludes that this mindset facilitates a "brain drain" in southern Appalachia, where most young adults who leave the County for college do not return because of the lack of jobs outside coal mining. Indeed, the economic research firm, Chmura, developed an Economic Diversity Index (ranging from a high of 1 to a low of 180) to assess the range of economic activity on a county-level (Chmura Economics & Analytics, 2020). McDowell County’s 126.45 index value is among the lowest in West Virginia; the area places in the bottom 7th percentile for relative industrial diversity (where the dominant industry is natural resource extraction) and bottom 6th percentile for relative occupational diversity (Center for Regional Economic Competitiveness, 2012). I will thus

consider both demographic and economic trends that can explain McDowell County's present-day distressed status.

Demographic Trends

McDowell County has suffered decades of population declines, low educational attainment, prescription-drug abuse, and low life expectancy. The population reached a peak of nearly 100,000 residents in 1950, falling to 22,113 by 2010 (U.S. Census Bureau, 2010). Only 64.9% of residents had at least a high school diploma while a meager 5.2% had a bachelor's degree or more, the lowest in the Appalachian region (U.S. Census Bureau, 2016). Furthermore, the male substance use disorder mortality rate grew to 72.5% in 2014. This 610% increase from 1980 is significantly higher than the national rate of 18.7%. In 2015, drug deaths eclipsed every other County in the United States, with 141 deaths per 100,000 residents (Rudd *et al.*, 2016). Keyes *et al.*, (2014) offer one explanation for the high rate of drug use in West Virginia, positing that aging areas like McDowell, where the percent of individuals over 65 exceeds those under 18, have a deteriorating economic infrastructure, leading to an adverse selection effect (U.S. Census Bureau, 2019): those with higher academic aspirations leave the County, whereas those who stay behind in an economically depressed area, are likelier to establish drug dependencies (Keyes *et al.*, 2014). This high susceptibility to drug use may contextualize the fact that males in McDowell County have a life expectancy almost ten years shorter than the national life expectancy (67 versus 76.7 for males in 2014) (I.H.M.E., 2016). Currently, little academic research assesses the prevalence of drug-induced deaths in rural areas like McDowell County, though Nandi *et al.*, (2010) observe an inverse correlation between economic deprivation and drug use cessation when analyzing injection drug use and income data from a cohort study in Baltimore City, Maryland. Though this report does not seek to evaluate the drivers behind the

complicated relationship between drug use and poverty, high drug use rates create a substantial economic barrier for Central Appalachian counties. McDowell County's abnormally low labor force participation rate (28.5%) may offer insight into how the drug epidemic has affected the local labor force (U.S. Bureau of Labor Statistics, 2020). French *et al.*, (2001) support this conclusion, relying on the 1997 National Household Survey on Drug Abuse to draw a significant negative relation between chronic drug use and male labor force participation.

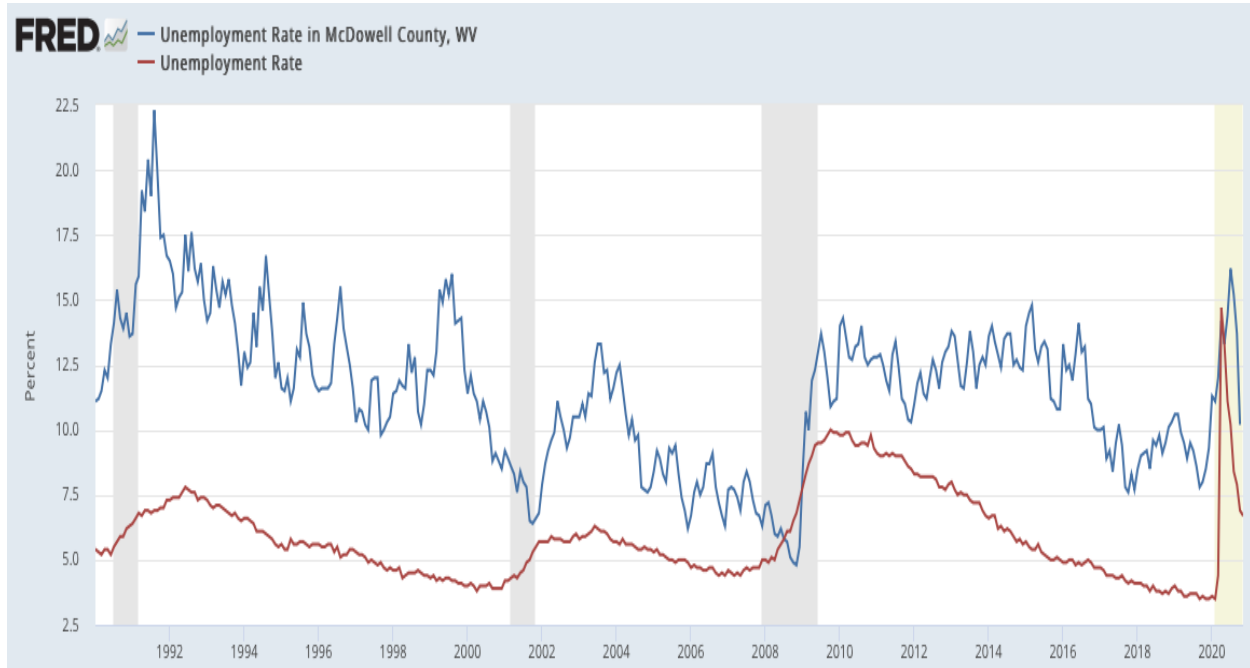
Economic Trends

McDowell County significantly lags behind the nation based on income, poverty, employment, and labor force participation. The County only has a \$15,378 per capita market income (P.C.M.I.), a mere 33.9% of the U.S.' P.C.M.I. (U.S. Census Bureau, 2018). McDowell County also has one of the highest poverty rates in the United States: more than 1 in 3 residents live under the poverty line, and some 34% of residents qualified for food stamp (SNAP) benefits (U.S. Census Bureau, 2018). Relatively high unemployment levels can partially explain McDowell's high levels of impoverishment. Figure III demonstrates how McDowell's unemployment rate has consistently been higher than the U.S.' rate (with two brief exceptions in 2009 and 2020).

Furthermore, during the early 1990s, early 2000s, and the Great Recession, the effects on unemployment for McDowell were consistently more pronounced than for the nation as a whole. For instance, from January 1990 to their respective peaks, the U.S. unemployment rate grew by 2.4 points, but the McDowell County unemployment rate rose by 11.1 points. This finding, consistent with Han and Goetz's (2015) observations, suggests that McDowell County is less resilient to economic shocks than the rest of the country on average. According to figure IV,

following the Great Recession, McDowell County's labor force contracted by nearly 1,500 individuals, a significant amount for a county with just over 22,000 residents.

Figure III.



Source: U.S. Bureau of Labor Statistics

Figure IV.



Source: U.S. Bureau of Labor Statistics

McDowell County's labor force participation rate is the second-lowest in Appalachia at 28.8%, less than half the nation's participation rate (U.S. Bureau of Labor Statistics, 2020). McDowell County's low labor force participation is likely symptomatic of both the aforementioned "Bad Omen" and "Demographic" views. The area has an aging population, which will naturally lead to decreased participation as the older demographic retires. However, this view only addresses a part of the story because the share of prime-age adults in the County's workforce has also decreased considerably. For instance, the participation rate for adults aged 25 to 44 declined from 50.7% in 2010 to 42.3% in 2019 (U.S. Census Bureau, 2019). Other factors, including the limited number of employment opportunities and aforementioned drug abuse, may discourage the work force. Having identified a distressed Central Appalachian County's characteristics, I will now analyze two case studies in the greater Appalachian region that offer a template for sustained, intensive economic growth.

Resilient County Case Study: Harrison

Background

Harrison County is a part-urban (63%), part-rural (37%) county located in the low hills of northwestern West Virginia (U.S. Census Bureau, 2010). Like McDowell County, Harrison has abundant coal reserves. Following a visit to the County's seat, Clarksburg, Howe (1845) remarked, "there are inexhaustible supplies of coal in the immediate neighborhood and being in the midst of a fertile country possessing great mineral wealth in its iron, salt, etc., it possesses the elements of prosperity." By 1840, area miners produced over 200,000 bushels of coal annually (U.S. Census Bureau, 1841). While resource extraction once constituted an important component of Harrison County's historic economic growth, the local economy now demonstrates far greater economic diversity than McDowell County: Harrison County boasts an economic diversity index score of 76.49, where U.S. counties on average possessed a value of 97.9, indicating that Harrison bests the national average (Chmura Economics & Analytics, 2020). The County places in the 76th percentile for relative industry diversity and the 95th percentile for occupation diversity (Center for Regional Economic Competitiveness, 2012). Although 786 coal miners still worked in Harrison County in 1990 (less than 1% of the area's labor force), by 2019, all of the County's mines were closed (West Virginia Office of Mine Health and Safety, 2020). Instead, 35.6% of the workforce held occupations in management, business, science, and arts occupations (educators often make up most of the latter category) while 22.1% worked in sales and office-related roles (U.S. Census Bureau, 2019).

Harrison County's two largest towns, Clarksburg and Bridgeport, are located next to the interstate highway that leads to the state capital. While each has dedicated economic development authorities, Clarksburg has a particularly diversified economy with two major

medical centers, a U.S. District Court, and an FBI division (Boetnner *et al.*, 2019). Nearby, prominent employers, including West Virginia University and Mylan Pharmaceuticals, contribute to the area's resilience. Other small-scale efforts have been made to reinvigorate the area following several decades of population declines. For example, Clarksburg offers grants to property owners for building restoration and awards tax incentives to businesses that locate in certain depressed areas of the city (City of Clarksburg, 2021). Additionally, "Healthy Harrison" provides County-based health and wellness businesses with resources to improve their community recognition. The establishment of the Bridgeport Farmer's Market also encouraged local farmers and businesses, leading to storefronts' return to the downtown area. Moreover, Clarksburg's city purchased the once-abandoned Robinson Grand Performing arts center to provide area-residents with a community center—an attempt to improve Harrison County residents' quality of life.

Demographic Trends

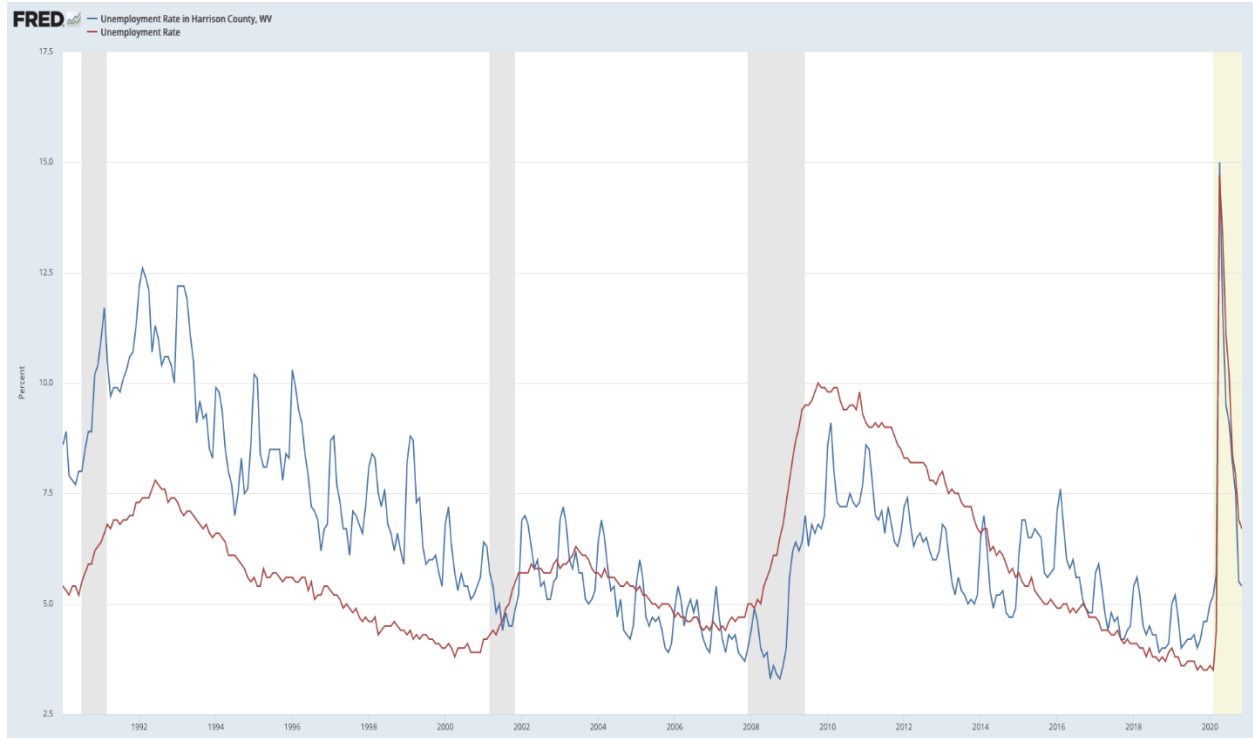
Harrison County has stabilized several decades of population declines. It offers education attainment rates in West Virginia's top quartile, lower than state-average drug abuse, and a life expectancy on par with the state. The County's population peaked in 1950 at 85,296, falling to 69,371 in 1990, remaining at that level for the next two decennial censuses (U.S. Census Bureau, 2010). The construction of several federal buildings, including the FBI's Criminal Justice Information Services Division and the United Hospital Center, helped reverse declines resulting from the moribund low-skill manufacturing and mining (Goetz *et al.*, 2019). Additionally, 87.7% of Harrison County residents have at least a high school degree, and 21.6% attained a bachelor's degree, placing the County in the top quartile for educational attainment within Appalachia and West Virginia (U.S. Census Bureau, 2016). Although Harrison County demonstrates a higher

rate of substance use mortality for males than the nation (29.5 per 100,000 residents versus 18.7), the state's overall substance use mortality rate (34) exceeds the County's rate (I.H.M.E., 2016). Likewise, while average life expectancy is lower than the nation's (73.3 versus 76.7 for males in 2014, a possible result of higher incidences of substance use, obesity, and smoking), Harrison County's life expectancy matches the state's average (73.6). Given these positive demographic trends, relative to McDowell County, I will analyze whether economic trends reflect consistent findings.

Economic Trends

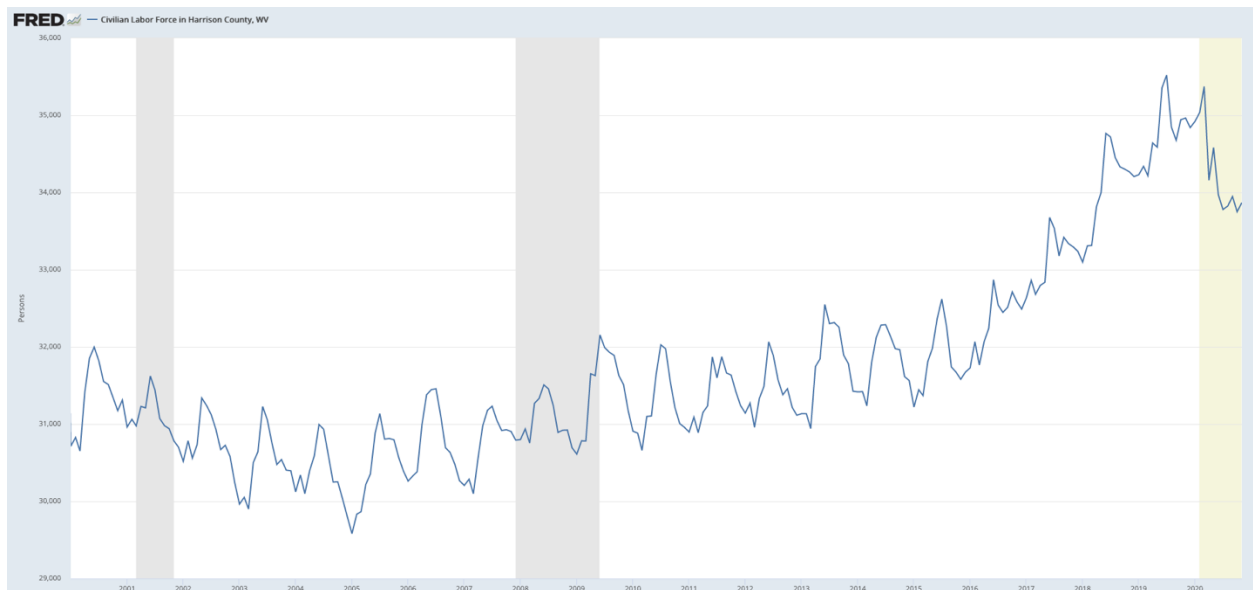
While Harrison County falls slightly behind the nation on income, poverty, employment, and labor force participation, it outperforms most Appalachian counties and demonstrates relatively high resilience to economic shocks. Harrison County's per capita market income of \$36,992, though only 81.5% of the country's P.C.M.I., is more than double that of McDowell County and among the top 10% of Appalachia's counties (U.S. Census Bureau, 2018). Despite the County's 15.4% poverty rate in 2018, which is four points higher than the country's, this number has improved considerably from a 1993 high of over 22%. According to 2018 data, Harrison falls within the top half of Appalachian counties. Correspondingly, the County's 5% unemployment rate bests the majority of other counties in the region. As demonstrated by figure V, since the beginning of the twenty-first century, Harrison County's unemployment rate has closely mirrored that of the United States, aside from a period of lower unemployment post-recession. Most notably, according to figure VI, the County's labor force size remained steady following the 2008 financial crisis, suggesting resilience to economic shocks. Until the unprecedented COVID-19 induced recession, the labor force size grew consistently.

Figure V.



Source: U.S. Bureau of Labor Statistics

Figure VI.



Source: U.S. Bureau of Labor Statistics

In particular, the health and education sectors have steadily increased since the turn of the century without any declines since 2008 (Goetz *et al.*, 2019). As such, Harrison County possesses a relatively healthy labor force participation rate of 58.6%, which falls within Appalachia's top quartile (U.S. Bureau of Labor Statistics, 2020). The case of Harrison County indicates that local development efforts to diversify economic activity and high levels of employment in health and education may successfully transition an economy away from one dependent on extractive industries.

Resilient County Case Study: Chenango

Background

Chenango County, a mostly rural area (83.4%), lies along the northern border of the congressionally-defined Appalachian region (U.S. Census Bureau, 2010). Unlike the aforementioned case studies, the area does not have a mining past. However, it historically relied on only two sectors—agriculture and manufacturing—for economic growth, much like McDowell and Harrison Counties' reliance on a select few industries. The county seat, Norwich, enjoyed economic growth as a result of its manufacturing prowess (e.g., piano and carriage production) during the mid-nineteenth century (Smith, 1880). German, west of Norwich, relied principally on dairying, with several large farms and creameries located in the town's center and surroundings. Although occupations in agriculture and manufacturing have ill-defined prospects, the County has managed to preserve these legacy sectors and diversify with the inclusion of food processing and financial services-based roles (Goetz *et al.*, 2019). For instance, N.B.T. Bank, a growing financial institution in the northeast, is headquartered in Norwich along with several other major insurance agencies (100+ employees) (Commerce Chenango, 2020). Thus, Chenango County has a diversity index of 107.04, slightly higher than the national average

(Chmura Economics & Analytics, 2020). However, the County falls in the 94th percentile for relative occupational diversity and the 74th percentile for relative industry diversity (Center for Regional Economic Competitiveness, 2012). Like Harrison County, Chenango County comprises of two key occupational groups: management, business, science, and arts (33.2%), and sales and office-related work (20%) (U.S. Census Bureau, 2019).

Given the centrality of agriculture and manufacturing to the local economy, area-business groups and elected officials formed Commerce Chenango. This organization seeks to build the County's resilience against shocks through a variety of initiatives, including grant and loan programs for businesses that build or renovate employment sites within the County. The group devised a six-pronged economic development plan in 2014 (Commerce Chenango, 2020) to accelerate the community's diversification. Its specific goals include worker education and job-specific training, development of the local tourism industry, business recruitment and retention initiatives. The plan also sets forth a number of action steps to analyze the County's current assets, such as human capital, proximity to interstate highways, and educational and cultural institutions. In the years since the plan's release, the County has enacted some of these strategies, emphasizing workforce retooling. For instance, the County provides financial support for workers engaged in training programs by offering childcare, transportation, and other auxiliary services to augment the program take-up rate (Goetz *et al.*, 2019). The County also lobbied the local community college, Morrisville State College, to implement programs and mini-courses that train area-residents for local employers' specific needs (Chenango Commerce, 2014). Having discussed the County's concerted efforts to enhance resilience, I will analyze local demographic and economic trends to assess Chenango County's development strategy's success.

Demographic Trends

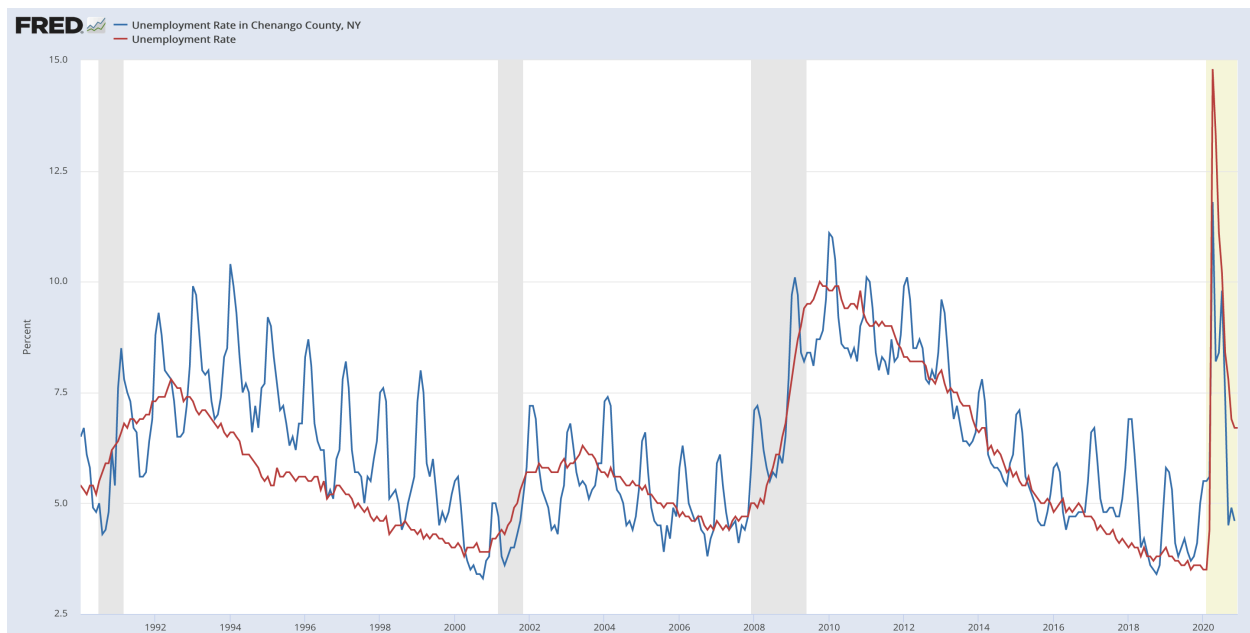
Although Chenango County's population growth has slowed in recent decades, its above regional-average educational attainment levels, low drug abuse, and on-par-with-the-nation life expectancy, demonstrates that Chenango is a high performing Appalachian County. The County's population peaked in 1990 at 51,768 residents, declining slightly to 50,477 in 2010 (U.S. Census Bureau, 2010). This decline followed the closure of multiple manufacturing firms, chiefly specializing in food production and packaging (Chenango Commerce, 2014). The businesses either closed or relocated their manufacturing arms to lower-cost areas. Of this population, 86.9% have at least a high school education while 17.4% hold at least a bachelor's degree, lower than Harrison County but greater than most Appalachian counties (placing Chenango in the 71st and 62nd percentiles, respectively) (U.S. Census Bureau, 2016). The mental and substance use disorder mortality for males, at 14.8 per 100,000 residents, is lower than both New York (17.6) and the nation (18.7) (I.H.M.E., 2016). Drug-related hospitalizations also best the state average with 19.3 per 10,000 residents recorded in Chenango County compared to 25.7 across the state (New York Department of Health, 2010). Likewise, the life expectancy (78.1) surpasses 87% of Appalachian counties and is on par with the U.S.' overall life expectancy for both gender groups (81 for females and 76.5 for males) (I.H.M.E., 2016). I will now evaluate whether Chenango County experiences similarly above-average economic trends, despite its slow population growth.

Economic Trends

Like Harrison County, Chenango falls below national averages for income, poverty, employment, and labor force participation; however, for all categories except employment, Chenango places in Appalachian counties' top quartile. With a per capita market income of

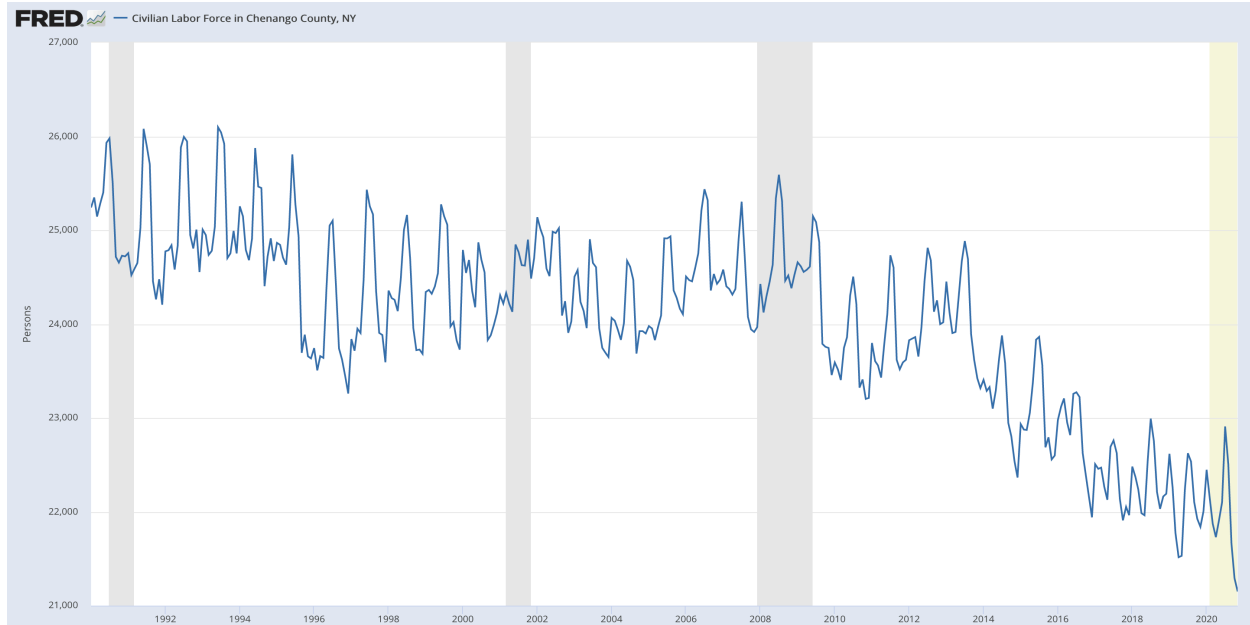
\$30,772, Chenango's P.C.M.I. is nearly double that of McDowell and exceeds 76% of other counties in the region (U.S Census Bureau, 2018). Poverty levels are also relatively low at 14.3%, below that of Harrison, McDowell, and 76% of Appalachian counties. Unemployment figures, however, are less exceptional, better than 56% of Appalachian counties. As reflected in figure VII, unemployment closely follows national trends. The differential between unemployment pre-recession and post-recession in Chenango County mirrors that of the nation. The county-level unemployment rate only edges above the nation's rate from 2016 to 2020.

Figure VII.



Source: U.S. Bureau of Labor Statistics

Figure VIII.



Source: U.S. Bureau of Labor Statistics

However, because of Chenango County's labor force size's relative stability immediately before and after the Great Recession, an ARC (Goetz *et al.*, 2019) report that relies upon Hans and Goetz's resilience framework identifies Chenango as the 289th most resilient U.S. county. In the years succeeding the recession, the expansion of the advanced manufacturing sector has been primarily responsible for the County's resilience. Chobani, an American-based food company, and Raymond Corporation, an international manufacturing firm, are two of the County's largest employers that fueled post-recession growth. Indeed, manufacturing, the dominant sector in economic recovery, accounted for 59.4% of job growth. Furthermore, Chenango's labor force participation falls within Appalachia's top quartile at 58.4%, despite a declining civilian labor force size, demonstrating that a relatively high number of area residents contribute to the County's output of goods and services (U.S. Bureau of Labor Statistics, 2020). While the County must reverse the falling population and civilian labor force to preserve its resilient status,

Chenango's demographic and economic trends reflect strength in a region plagued by high poverty levels.

Discussion

There are several common themes that can be drawn from the outcomes of McDowell, Harrison, and Chenango Counties. First, all three areas fall beneath national averages on key factors, including employment, labor force participation, and poverty. Although Chenango and Harrison are transitional counties, they are still beleaguered by the same economic challenges that afflict the greater Northern and Central Appalachian regions. Both Central Appalachian counties must also contend with higher than national average drug abuse rates. The literature suggests a statistically significant relationship between substance abuse and labor force participation (French *et al.*, 2001). In order to ameliorate high rates of nonemployment in Appalachia, further research will need to assess if a causal relationship exists between these two factors.

Second, despite these issues, Harrison and Chenango Counties demonstrate far greater economic and occupational diversity than McDowell. Both areas have made concerted efforts to diversify their economies by offering employer incentive programs, and attracting federal and medical facilities (Harrison County), which provide relative stability in the face of sudden economic downturns. Private, nonprofit organizations have also encouraged diversification in the two counties. Kodryzcki and Munoz (2015), from their analysis of resurgent cities (former industrial areas that have adapted to post-industrial economies), find that the most successful economic development efforts occur in areas with private, non-profit organizations, like Healthy Harrison and Commerce Chenango. While Harrison and Chenango County historically relied on resource wealth as primary modes of economic activity, they have expanded into skilled

manufacturing and professional services sectors. McDowell, on the other hand, has made few meaningful attempts to diversify, contributing to its long-run struggle to transition from its extractive industry-reliant economy.

Third, Harrison and Chenango exceed regional averages in educational attainment for both high school and college graduation. This finding is in line with Goetz *et al.*'s (2019) study, which establishes a significant relationship between an area's economic resilience and its education levels. Commerce Chenango has specifically developed an innovative partnership between local employers and schools to retrain workers with in-demand job skills. In the next section, I will consider the literature that evaluates the efficacy of direct public investment, local subsidies, and training programs, all of which are found in Harrison and Chenango Counties, as a means of place-based economic development.

A Blueprint for Place-Based Economic Development

Literature Review

As this report has established, over the last few decades, the U.S. has stratified into regions of relative wealth and prosperity. Some economists and policy makers view place-based economic development initiatives as an important mechanism by which depressed regions can achieve parity with other parts of the nation (Austin *et al.*, 2018; Bartik, 2019; Nunn *et al.*, 2018). Place-based development programs have a rich history in the U.S. and other parts of the world, including the E.U. and U.K. While programs in the E.U. generally fall under the purview of “cohesion policy,” large-scale infrastructure projects that increase regional integration, the U.S. strongly relies upon enterprise zones, indirect benefits tightly targeted toward about 3,000 metropolitan areas (Ehrlich and Overman, 2020). However, the U.S. also boasts large-scale infrastructure initiatives of its own with the Appalachian Regional Commission and Tennessee

Valley Authority. A robust economic literature has emerged to evaluate the efficacy of such programs both in the U.S and the E.U. I will examine the literature that studies direct public investments, local employment subsidies, location specific credits, and localized training as a means of achieving regional development. Some of the aforementioned policies have demonstrated more positive outcomes than others but, as Austin *et al.*, (2018) argue, place-based programs have the most potential for success when concentrated in areas that will have a significant behavioral response. They liken this rationale to findings from papers discussing policing policy. Whereas Vidal and Mastrobuoni (2018) discern little to no effect when police units are spread out equally over high-crime and low-crime areas, Braga, Papachristos, and Hureau (2014) find a statistically significant effect associated with place-based crime reduction (where units specifically target high-crime areas). This same logical framework is applied by advocates of place-based economic policy (Nunn *et al.*, 2018). For instance, West Virginia has a high non-employment rate relative to Wyoming. Austin *et al.*, (2018) find, based on their empirical analysis, that states like West Virginia have higher employment elasticities and a greater optimal employment subsidy. Federal resources, therefore, will most efficiently be allocated toward areas with a highly elastic labor supply. The succeeding analysis of place-based policies is pertinent to my discussion of the Appalachian region, which suffers from endemically low labor force participation. Thus, I will evaluate the success of these initiatives based on their ability to positively affect labor market outcomes.

Direct Public Investment

The Appalachian Region boasts several of the U.S' longest-standing and far-reaching direct public investment programs: the ARC and the Tennessee Value Authority (TVA). Unlike enterprise zones, which typically target specific metropolitan areas, these public investment

initiatives are directed toward larger depressed regions (i.e., Central Appalachia). This report has already discussed the ARC's history and its positive outcomes. Jaworski and Kitchens (2016) analyze the impact of highway construction expenditures, which constituted two-thirds of the ARC's budget. These highways increased local jobs by 5.2% and annual income by 1.3%, according to their analysis. Bartik (2019) equates this income growth to \$13.7 billion (2018 dollars). The TVA overlaps with portions of the ARC service area, encompassing all of Tennessee and parts of surrounding states (Alabama, Georgia, Kentucky, Mississippi, North Carolina, and Virginia). The federally operated corporation primarily supports public infrastructure investment, namely into canals, dams, highways, and electrification (Bartik, 2019). Kline and Moretti (2014) study the long run effects of the TVA, concluding that the program was successful in expediting the region's industrialization as well as providing well-paying manufacturing jobs. Since its founding in 1933, as part of the New Deal, they estimate that the program has generated over 250,000 jobs. They caution, however, that their analysis primarily focused on the period spanning from 1940 to 1960, a time at which the manufacturing sector enjoyed steady growth in the U.S. Likewise, Becker *et al.*, (2010, 2012) test for the effects of similar direct investment programs in the E.U. They consider the E.U.'s structural funds program, which provides grant support for infrastructure investments in regions with declining economic growth. Becker *et al.*, find a strong positive correlation between regions with targeted infrastructure investment and per capita GDP growth. While they fail to see an effect on employment, they hypothesize that their findings suggest greater regional productivity, with job creation likely increasing in the long-run. Indeed, research assessing both the Appalachian region and abroad suggests that infrastructure investment can equalize regional deficits in economic growth and employment outcomes. However, given that the Northern, Central, and Southern

Appalachian subregions have progressively diverged from one another, despite the presence of significant direct public investment expenditures, other place-based policy alternatives must be identified to address nonemployment on a more local level.

Local Employment Subsidies

In the late 1990s, “Empowerment Zones” represented an increasingly fashionable approach toward reversing the effects of poverty in the U.S., particularly in urban areas suffering from the effects of de-industrialization. This policy originated from an initiative undertaken by the Thatcher administration in the United Kingdom, the “Regional Selective Assistance” program (RSA), which targeted urban neighborhoods suffering from the throes of deindustrialization (Kline and Moretti, 2013). The E.U. earmarked which regions qualified as “Assisted Areas,” and the British government distributed the subsidies accordingly, offering incentives (i.e., grants and regulatory breaks) to encourage employer relocation to affected areas. Criscuolo *et al.*, (2012) observe that a 10% investment subsidy generated a 1.3% fall in unemployment in the treated areas. They notably concede that positive outcomes were generally limited to circumstances where small firms (under 150 workers) were offered incentives. Larger firms took advantage of incentives without any meaningful changes to their employment levels or community investment. Criscuolo *et al.*, reach these findings by exploiting changes to the E.U.’s definition of an “Assisted Area” from 1993 to 2000. This had the subsequent effect of shifting which areas the British government directed funding toward. The rigorous eligibility requirements defined by the E.U. differentiate the U.K.’s RSA program from the vast array of enterprise zones later established in the U.S. Unlike the U.K., the U.S. government cannot limit states’ ability to offer subsidies to businesses (Austin *et al.*, 2018).

About a decade after the launch of the RSA program in the U.K., enterprise zones were established in the U.S. to provide targeted incentives for areas meeting a patchwork of certain poverty and unemployment criteria. “Empowerment Zones” were established by the federal government in 1993, though some local municipalities initiated similar programs in the 1980s. These enterprise zone policies can generally be organized into three categories: private investment incentives, labor incentives, and financing programs (McDonald, 1997). They generally target specific economically-distressed urban areas. Though widely studied, the consensus regarding the effects of such programs has been mixed at best, and some more recently published literature has soured on the economic returns of such programs. Kolko and Neumark (2010) study California’s enterprise zones and found no statistically significant effect on employment. Elvery (2009) conducts a similar study, focusing on enterprise zones in California and Florida. He fails to identify a positive employment effect. Ham *et al.*, (2011), by contrast, use census tract-level data to conclude that both locally and federally established zones significantly affected labor market outcomes. Since then, Neumark and Young (2019) published an article attributing Ham *et al.*’s findings to faulty control groups and significant data errors. Neumark and Young independently assess these zones using a “before and after method” and relied on altered control tracks to ultimately disprove Ham *et al.*’s findings. Furthermore, Reynolds and Rohlin (2014) dispute outcomes found elsewhere, by suggesting that evidence of positive mean effects conceal important distributional factors. They conclude that Empowerment Zones attract high-income residents, boosting an area’s mean annual household income. In these same areas, however, they find a 1.1% increase in the individuals living in extreme poverty. Therefore, according to Reynolds and Rohlin’s work, Empowerment Zones do not necessarily ameliorate the impoverished circumstances of those living in poor areas. Evidently, both state

and federal enterprise zone policy efforts have failed to consistently demonstrate positive benefits—their success varies over time period and place. Future research will need to address the idiosyncracies of enterprise zone policies to understand the factors differentiating the few studies with positive job creation outcomes to those with negative outcomes.

Individual Location-Specific Credits

While local employment subsidies attempt to attract employers to a local region, individual location-specific credits impel individuals to relocate to a specific area. Such subsidies can be offered at all levels of government; for instance, Norway offers tax incentives to citizens in less desirable northern regions as a concerted spatial policy (Austin *et al.*, 2018). Furthermore, on a more local level, villages suffering from the effects of de-population in Southern Italy induce residents to relocate with virtually free housing and stipends. Similar programs in the U.S. have gained traction, spanning from Natchez, Mississippi to the state of Vermont, where individuals were offered \$10,000 to move (Vermont Agency of Commerce and Community Development, 2020). However, these programs are largely in their infancy with little to no research evaluating their impacts given their small scale. As Austin *et al.*, (2018) assert, encouraging people to relocate to an area with already high levels of nonemployment may only exacerbate a region's nonemployment.

State taxes constitute a far more common example of location-specific credits, where certain states may attempt to spur tax-based migration because of relatively low taxes. Bakija and Slemrod (2004) identify a relationship between an in-flow of wealthy senior residents and low estate taxes. Akcigit *et al.*, (2018) perform a case study of eight states, identifying that state tax rates are a strong negative predictor of inventors' in-migration decisions. This leads Akcigit *et al.*, to conclude that individual location-specific tax credits have important implications for

local innovation. However, the literature suggests few other trends that can broadly be associated with tax-based migration, suggesting further research needs to explore the viability of individual location-specific credits as a means of spurring a region's job growth (Austin *et al.*, 2018).

Customized Training Programs

Place-based pre-professional and work-skill training programs have been discussed by developmental economists—including Austin *et al.*, (2018) and Hausmann *et al.*, (2013)—as pathways toward diversification, which mitigate poverty and unemployment. Rodrik (1996) asserts nations can fulfill one of three economic roles: highly skilled, high output; low skilled, low output; or a combination of the two. He claims that government investment in human capital is essential toward achieving a high output, diversified economy.

Developmental economists have evaluated the impact of various skill-training programs throughout the country. Some programs, such as the Job Partner Act of 1982, have been implemented on a national level, targeted toward low-skill individuals in areas across the nation. Much like enterprise zones, other job-training programs operate at the state-level, where state officials decide which areas are eligible for job-training grants or classroom training programs. Bartik and Ericcek (2014) analyze the research literature on economic development incentives: they conclude that generalized training programs offer mixed results but contend that targeted initiatives that teach in-demand skills yield more promising outcomes. Bartik (2019) postulates that subsidized job training through community college and university programs resolves several critical market failures. For instance, small firms may not have the resources or infrastructure to effectively train workers. They may also underinvest in training out of hesitation for expending resources on employees not committed to staying with the company. Moreover, public agencies

screen which institutions receive funding, ensuring that workers are efficiently and properly trained.

Neumark (2018), building off weak evidence for enterprise zones, argues in favor of a customized job training initiative through a detailed policy proposal, which he calls “Rebuilding Communities Job Subsidies” (RCJS). He advocates a two-phased approach, where the federal government fully subsidizes salaries of workers-in-training, after which workers transfer to private sector roles subsidized at a 50% rate by the government. While enrolled in these positions, workers will engage with developmental opportunities to expand their human capital. When supporting his proposal, he references earlier research from Hellerstein *et al.*, (2008), which demonstrates that the skill level of one’s network can effectively incentivize gainful employment in disadvantaged areas. Therefore, programs that expose non-employed individuals to networks with in-demand skills have the potential to generate positive employment outcomes. Caliendo and Schmidl (2016) find some positive effects associated with on-the-job training initiatives for youths in their assessment of European countries, including higher employment take-up when work experiences are subsidized. Though they draw mixed results from the efficacy of job-training programs, Caliendo and Schmidl surmise that adverse economic conditions and imperfect balances of classroom and practical training drove the negative results. They find that job-training performed entirely in the classroom generates a clearer positive effect. In addition, studies they analyze have relatively short observation periods (ranging from only several months to two years). Card *et al.*, (2018) consider a set of 207 studies, across different age groups, which offers more heartening support for human capital style training programs. They are able to assess the longer-term impact, finding that while the effects of job-

training programs are negligible in the months after completion, a stronger positive relationship emerges following 2 to 3 years.

Indeed, out of all of the place-based programs considered, technical re-education programs for adults offer the most consistently positive outcomes. Robins and Greenberg (1997) summarize findings from 14 voluntary training initiatives, finding the most significant positive effects on adult women's earnings. While the programs had a less pronounced influence on adult men's earnings, Robins and Greenberg observe earnings growth for men enrolled in the national voluntary training system, created under the Job Partner Act of 1982 (JTPA). However, Robins and Greenberg concede that the aggregate effects of JTPA are minimal, largely because of budgeting restrictions that limit the extent of the program's outreach. Romero (2009) studies a similar program initiated in the U.K., "the New Deal for Communities," by comparing treated neighborhoods with nearby but not adjacent neighborhoods. She discerns an increased likelihood of achieving full-time employment when residents are enrolled in job-skill training.

Osterman (2006) argues that technically-oriented community college programs are an effective mechanism by which federal and state governments can subsidize job-training in distressed areas. Bahr (2019) finds positive and significant impacts for community college attendees who earned the majority of their credits in career and technical education (CTE), supporting Bartik and Ericcek's (2014) finding that job training programs are most effective when targeted toward in-demand technical skills. In a recent study, Brunner *et al.*, (2020) analyze the labor market outcomes of students attending CTE high school programs in Connecticut. They deduce that male students achieve 32% higher earnings than high school students in the control group. Moreover, Hollenbeck (2008) studies the impact of CTE public subsidies, identifying significant returns to a grant program implemented in Massachusetts: the

public cost of creating or retaining primary sector jobs was less than \$9,000 per job, lower than the price of most development initiatives. Subsequent studies have evaluated labor market returns to community college degrees and find substantial value in incentivizing prime-age adults to pursue associate degrees and certificates. Jepsen, Troske, and Coomes' (2014) analyze the returns on community college credentials for Kentucky students, finding that an associate degree yields quarterly returns of about \$3,300 for females and \$2,000 for males (2021 dollars). Likewise, Belfield, Liu, and Trimble (2014) observe that long-term certification programs have a positive return of \$1,722 for females and \$620 for males (2021 dollars). In contrast, an associate degree garners a return of approximately \$2,098 for females and \$1,246 for males.

Summary

This report has repeatedly emphasized the spatially heterogeneous nature of both the U.S. and the Appalachian Region. Communities like Harrison and McDowell coexist in relative proximity to each other; despite this, as the case study analysis revealed, McDowell faces different and more foundational development issues. Therefore, a one size fits all approach is not sufficient for achieving intra-regional parity. While large-scale initiatives like the ARC and TVA have found some success with their major infrastructural investments, the current state of Appalachia reveals that these programs cannot, by themselves, overcome negative migration and labor force participation trends. As the below table (table I.) demonstrates, other initiatives, including local employment subsidies and location specific credits, suffer from a lack of any broad agreement in the literature. By contrast, customized job training programs offer promising potential based on the labor market returns observed in diverse settings in the U.S. and abroad.

Whereas some economists find positive effects (Ham *et al.*, 2011), most fail to observe any effects and some even draw negative outcomes from U.S. enterprise and empowerment zone

programs (Kolko and Neumark, 2010; Reynolds and Rohlin, 2014). A factor that may contribute to the relative success of some employment subsidy programs in the U.K. is their relative scarcity compared with those in the U.S. Criscuolo *et al.* (2013) discern a positive and significant increase in employment with a similar initiative in the U.K., the RSA program. While RSA targets 71 impoverished urban areas across the country, the U.S. has a patchwork of nearly 3,000 enterprise zones, which likely dampens the effect that any one zone may have in stimulating development. Nonetheless, the existing literature provides only equivocal evidence in support of local employment subsidies. Further research will need to identify what commonalities the successful programs share and whether this propensity for success can be realized in rural areas.

Likewise, though some policy-makers have devised innovative location specific credit programs, the research on these programs remains sparse. Several studies evaluate whether credits alter migration patterns, by exploiting changes in state tax policy. They find that lower local taxes can induce in-migration. However, lowering tax rates does not, by itself, constitute meaningful economic development policy because inducing individuals to move to areas experiencing already high levels of non-employment may only enhance the problem (Bakija and Slemrod, 2004; Akcigit, 2014).

The preceding literature review of place-based education programs strongly supports the position that human capital investment can yield economic development, especially in the long-run. Customized job training programs offer the most consistent results in improving employment outcomes relative to the other considered place-based policies. The literature considers a diverse array of training initiatives, ranging from subsidized work experiences to classroom training. Perhaps surprisingly, classroom-skills learning engenders similar long-term effects to on-the-job training and, in some cases, generates even more significant returns than on-

the-job initiatives (Caliendo and Schmidl, 2016; Card *et al.*, 2018). In particular, CTE job training programs studied in both rural and urban settings reveal positive labor market returns, which has important implications for policy proposals that seek to address endemic nonemployment rates in Appalachia (Jepsen, Troske, and Coomes, 2014).

Table I.

Direct Public Investment			
<i>Author</i>	<i>Name of Program</i>	<i>Program Features</i>	<i>Effects</i>
Becker <i>et al.</i> , (2010)	Structural Funds (E.U.)	Regions with GDP level below 75% of E.U. average qualify for structural fund grants	Raised per-capita income by about 1.8% compared to nearby regions (1989-2006)
Kline and Moretti (2014)	Tennessee Valley Authority (U.S.)	Canal, dam, highway, and electric infrastructure construction in South-Central Appalachia	Program generated over 250,000 jobs and raised productivity of U.S. manufacturing by .3% (1940-1960)
Jaworski and Kitchens (2016)	Appalachian Development Highway System (U.S.)	Highway Construction in Appalachian Region	Increased local jobs by 5.2% and annual income by 1.3% (1960 compared to 1985, 2010)

Local Employment Subsidies			
<i>Author</i>	<i>Name of Program</i>	<i>Program Features</i>	<i>Effects</i>
Elvery (2009)	California and Florida Enterprise Zones (U.S.)	California and Florida's enterprise zones both sought to achieve poverty reduction, principally through tax credits awarded to local businesses	Zone residents less likely to be employed than residents of observationally similar areas (1970, 1980, 1990)

Kolko and Neumark (2010)	California Enterprise Zones (U.S.)	California's enterprise provides businesses with incentives to relocate to distressed urban areas and to hire from these areas	No significant effect on employment (1992-2004)
Ham <i>et al.</i> , (2011)	State Enterprise Zones and Federal Empowerment Zones (U.S.)	State enterprise zones vary state-by-state but generally targeted for state tax incentives because of lagging development. Federal empowerment zones provide tax incentives as well as tax-free bonds to spur location-specific investment	Enterprise zones decreased unemployment by about 1.6%. Empowerment zone designation decreases unemployment by 8.7% (1980, 1990, 2000)
Criscuolo <i>et al.</i> , (2013)	Regional Selective Assistance (U.K.)	Grants and regulatory breaks for employers locating or expanding in depressed urban neighborhoods	Increased local manufacturing jobs by 2.8% and decreased unemployment by 1.3% (1997-2004)
Reynolds and Rohlin (2014)	Federal Empowerment Zones (U.S.)	Federal empowerment zones provide tax incentives and grants to encourage employment within distressed areas	Increase in impoverished households within zones (1990, 2000)
Neumark and Young (2019)	State Enterprise Zones and Federal Empowerment Zones (U.S.)	<i>Analyze same Census-tract data studied by Ham et al., (2011)</i>	Weak and insignificant effects on unemployment (1980, 1990, 2000)

Location Specific Credits			
<i>Author</i>	<i>Name of Program</i>	<i>Program Features</i>	<i>Effects</i>
Bakija and Slemrod (2004)	Diverging state estate and sales tax rates (U.S.)	Changes in state tax policy exploited	Estate and sales taxes reduce the probability of wealth senior

		using federal estate tax return data	individuals relocating to a jurisdiction (1965-1998)
Akcigit (2018)	Diverging state income tax rates (U.S.)	Varying taxation rates across neighboring counties in different states	Average tax rate is strong negative predictor of inventors' location-choices (1940-2000)

Customized Training Programs			
<i>Author</i>	<i>Name of Program</i>	<i>Program Features</i>	<i>Effects</i>
Robins and Greenberg (1997)	Adult Job-Training Programs (Public Service Employment, Job Partner Act, Comprehensive Employment and Training Act) (U.S.)	Remedial education in core skill areas, job-specific training, subsidized "work experience" positions for individuals in targeted areas	Classroom-skills learning generated strong positive earnings effect on women, modest for men, insignificant for youths (1964-1998)
Hollenbeck (2008)	Massachusetts Worker Training Fund (U.S.)	Job-training grants awarded to in-state organizations and companies	Primary sector jobs created at cost of less than \$9,000 per job and 2.8-8% estimated return to workers (1999-2006)
Romero (2009)	New Deal for Communities (U.K.)	Job-training and full time education for individuals in 39 of the U.K.'s most deprived neighborhoods	NDC increased the probability of employment for individuals living in NDC areas (2002-2004)
Jepsen, Troske, and Coomes (2014)	CTE Community College Education (U.S.)	Kentucky community college certificate programs and diplomas for prime-age adults	Training in CTE fields generates positive and significant earnings outcomes for prime-age males and females(2002-2004)
Caliendo and Schmidl (2016)	Active Labor Market Programs (E.U.)	Training courses, job assistance, subsidized employment, and public work programs for individuals in depressed areas	Statistically significant effects for subsidized work experiences. Out of 20 studies, 9 yield significant, positive

			effects for classroom-based training (1995-2007)
Card <i>et al.</i> , (2018)	Active Labor Market Programs (primarily, Australia, E.U., N.A., L.A.C., and U.K.)	“Human capital” style job training programs and work first initiatives	ALMPs have positive significant impacts on employment during periods of low growth and high unemployment (2007, 2014)
Bahr (2019)	California Career and Technical Community College Education (U.S.)	College credits offered in fields that are closely linked with in-demand employment sectors (public safety, skilled blue collar)	Non-completing students witnessed average annual earnings increases over \$1,000 in CTE fields (2002-2008)
Brunner <i>et al.</i> , (2020)	Connecticut Technical High School System (U.S.)	High school credits offered in courses that train students for vocational employment	Male students graduating from technical school exhibit 31% higher quarterly earnings, though no discernible effect is observed for female students (2006-2013)

Description of the Intervention

Based on my qualitative analyses, I suggest a place-based proposal designed to explore the viability of a conditional, subsidized worker re-training program in Central Appalachia. This intervention proposes funding two-year degrees at West Virginian community colleges by allocating a total of \$4,256,000 toward job-training scholarships. My recommendation to train workers through the community college system arises from the substantial literature that demonstrates the efficacy of CTE community college programs (Belfield, Liu, and Trimble, 2014; Jepsen, Troske, and Coomes, 2014). The preponderance of the evidence supports classroom training as a productive mechanism by which to reskill workers (Card *et al.*, 2018).

The treatment will target individuals residing in three of the state's poorest counties—Gilmer, Clay, and McDowell (with a combined population of 39,000) (U.S. Census Bureau, 2010). The \$4,256,000 award constitutes about .5% of these counties' overall G.D.P. (Bureau of Economic Analysis, 2018). To receive a scholarship, individuals must agree to reside in West Virginia for four years after earning their community college credentials. The literature has suggested that the effects of such programs only become apparent after an evaluation period of at least 2 to 3 years (Card *et al.*, 2018). The conditionality aspect is a core component of the program; while the preceding literature review already revealed significant and positive returns to job-training and technical community college education, no studies to my knowledge consider the out-migration choices of students once completing these job-training programs. Developing nations use a similar conditional model to attract their citizens studying internationally to return to their home countries upon graduation (Güngör and Tansel, 2012); however, the limited studies that calculate the effects of these programs fail to reach a consensus. Thus, this intervention will seek to assess how place-based training can slow the “brain drain” afflicting the Appalachian region.

Only about 20% of West Virginians over 25 years old have a college degree, which is substantially lower than the 31.5% nationwide average (U.S. Census Bureau, 2018). Therefore, federal subsidization of job training programs for tradesmanship (i.e., plumbers, electricians, and carpenters), entrepreneurship, information technology, and other high wage professions for prime-age adults (ages 25 to 54) could offer a promising future for low-skilled Central Appalachian workers. However, education should not be mistaken as an antidote to the state's and greater region's economic woes. This report has discussed the damaging effects of the "brain drain" currently affecting the region, where young people pursuing higher education express an interest to leave: low wages, limited professional opportunities, low returns to investment, and

low regionwide educational attainment fuel college students' desire to leave Central Appalachia (Vazzana and Rudi-Polloska, 2019). In Vazzana and Rudi-Polloska's case study of an Appalachian liberal arts college, they find that an Appalachian college graduate is substantially likelier to leave the state than a low-skilled individual. Furthermore, they claim an Appalachian with a college degree is 4 times more likely to relocate from the region than someone who has only completed their high school education. Therefore, policy proposals targeting professional development must also have a mechanism for limiting this exodus of high-skilled workers from the region.

While low take-up has marred efforts to measure the efficacy of specific economic development initiatives (e.g., microloans), I anticipate a high take-up rate based on the limited literature evaluating conditional community college scholarships in the United States. For example, Barrow *et al.*, (2012) recruited adults (aged 18 to 34) to assess the impact of a performance-based Louisiana community college scholarship with a sample goal of 1,000 students. The recruiters exceeded their goal with a sample size of 1,019 and ceased their recruitment efforts after receiving an overabundance of interest. While this evidence is anecdotal and lacks established precedent in the literature, existing research suggests that the proposed intervention will satisfy my target sample size as long as the recruitment process is sufficiently straightforward (in contrast, for instance, to the Pell Grant's complex application requirements) (Mani *et al.*, 2015).

Treatment Group

I propose an intervention with a target sample size of 1,064, where 532 participants from Gilmer, Clay, and McDowell counties will be awarded \$8,000 (the approximate average cost of a two-year degree from West Virginia community colleges) to enroll in a two-year-long associate

degree program (60 credits, 4 semesters) (U.S. News & World Report, 2020). These residents will be randomly selected from a pool that agrees to both partake in a West Virginian community college program and to live in the state of West Virginia four years after graduation; therefore, the unit of assignment for the treatment group will occur at an individual level, where consenting individuals randomly receive a full community college 2-year scholarship. Outcomes will also be measured individually. If participants in the treatment group breach their agreement by moving out-of-state, they will be required to pay the award amount in full, and their earnings outcome will be calculated as 0 following their out-migration.. Students in this group will be monitored from quarter 1 of the study until quarter 24 (six years total) to assess their earnings during enrollment and four years after graduation.

Control Group

The control group will comprise 532 randomly selected residents—the same number of individuals in the treatment group. At the onset of the six-year trial, these individuals will reside in the same three counties: Gilmer, Clay, and McDowell. As individuals in the treatment group are ages 25 to 54, residents in the control group must also fall within the same age-range at the start of the six-year evaluation period to ensure parity. Individuals in the control group are not bound to staying in the state of West Virginia for four years, unlike those in the treatment group. Therefore, those who move away from the state will no longer be evaluated and, thus, do not affect the state's output for the remainder of the trial (unless they move back).

Theory of Change

Do recipients of publicly-funded scholarship programs demonstrate higher earnings outcomes than non-program recipients living in the same area? Moreover, if these programs generate returns for recipients, can they effectively disincentivize recipients from moving away

(i.e., the "brain drain)? Positive findings collected from CTE job training programs motivate the basis of the intervention: by earmarking the equivalent of .5% of Gilmer, Clay, and McDowell counties' GDP to fund community college scholarships for residents, do I observe a higher, long-run regional income?

Ultimately, the underlying theory of change is that low-skill individuals, who receive scholarships to attend job-training community college programs, will contribute to better regional earnings outcomes. As this study analyzes six years-worth of data, individuals in both treatment and control groups will likely have higher earnings given their relative experience in the workforce (assuming employment). The program's success will be measured by aggregating graduates' earnings outputs over the four years following their graduation and comparing the earnings outputs of individuals who comprise the control group. This will help determine the effect, if any, of conditional job training scholarships.

If the treatment group demonstrates statistically significant improved earning outcomes over the four years following graduation, this provides a potential future policy mechanism that can be expanded to narrow the divergence between Central Appalachia and other parts of the nation.

Empirical Specifications

I propose calculating treatment effects from the intervention by adhering to a similar framework as Bahr *et al.*, (2015). This involves regressing outcome variables as dummies on the treatment arm (including a student's award type and intended major), as well as demographic characteristics, and community college cohort effects.

$$Y_{earn_{it}} = \alpha_{it} + \beta_1 treatment_{it} + \beta_2 intent_{it} + \gamma X_{it} + \rho Z_{it} + \varepsilon_{it}$$

The i subscript represents each person, such that one can evaluate members of the treatment and control groups individually. The t subscript represents a quarter, as individuals will be evaluated quarterly over the six years (24 quarters total). The dependent variable is a given earnings outcome for an individual in quarter t . TREATMENT represents the key variable: community college/technical school attendance, which is a dummy variable, that is equal to 1 when enrolled and 0 when not. INTENT measures students' intended area of study (CTE versus, non-CTE). The omitted category is the control group, which has not received any type of award. The vector X is a series of student-level covariates, including age, race, educational level, income bracket, and employment status. The vector Z accounts for school cohort fixed effects. Finally, the error term, ε , comprises hard-to-measure variables, including the effort that each recipient exerts while in the program (presumably, those who exert low effort will realize low or statistically insignificant returns) and their ability to find a job following graduation.

Outcomes

This intervention's primary outcome is the change in earnings associated with a conditional scholarship award for a certification or associate program. While I acknowledge that both groups will demonstrate some earnings growth (controlling for inflation) over the four years because of work experience and subsequent promotions, this proposal evaluates whether there is a significant differential in average earnings between the two groups. If there is an observed improvement in the treatment group's earnings compared to the control group, the calculated change can be attributed to conditional community college or technical school scholarships.

I will also explore potential secondary effects resulting from my intervention. For instance, Glaeser and Saiz (2004) analyze the impact of increasing human capital within a locality, finding substantial spill-over effects. Skilled workers attract other skilled workers,

leading to population increases in high-human capital areas. The scope of this initiative is too small to observe any statistically significant impact. However, if scholarship recipients realize higher earnings following completion of their certificate or degree, this may encourage other community members to enroll in job-training programs after witnessing their neighbors' enhanced earning potential. Much of the research that discusses human capital spillovers only considers high-skilled and low-skilled urban areas. If the primary impact is successfully observed, future research should consider the extent to which such spill-over effects exist in rural locations.

The intervention may have an additional secondary effect where conditional scholarship recipients demonstrate greater persistence in their job roles following program completion. This principle is rooted in the psychology of sunk costs (Arkes, 1985). An individual has a greater tendency to exert effort into an endeavor once one has already invested their time to a cause. In the context of this intervention, individuals in the treated group invest two years' worth of time into their reskilling and job training. Thus, individuals in the treatment group may witness higher long-run earnings than those in the control group partially because of this effect. Therefore, a potential issue will be separating out these effects from the effects, if any, of technically-oriented job training.

Future Research

While the proposed initiative would reveal important findings about the direct effects of a place-based conditional community college scholarship, a larger initiative is eventually necessary to capture the effect of increasing human capital in a region. The ultimate goal of this policy is to change places not people. A larger intervention would reveal whether such a program attracts more employment and opportunity to a distressed area. Therefore, in order to capture

these equilibrium effects, I recommend further research that randomizes scholarship awards at the site level. For instance, if the program were broadened to include the state of West Virginia, the state's 20 community colleges would be randomly assigned to the treatment and control groups. Fryer (2014) overcomes challenges associated with analyzing a small sample of schools by employing matched pair-randomization, where he finds the pairs of candidates that are most similar across a set of variables (e.g., average test scores and total enrollment) and then randomizes within each pair of schools. Instead of assessing individual income and employment, each school's average income and employment outcomes would be evaluated before and after the intervention to determine if there exists a divergence between the treatment and control groups. The findings from both experiments would, hence, provide a holistic evaluation of the individual and community-wide impact of a conditional place-based scholarship program.

Conclusion

The first portion of this report considered the history of the Central Appalachian region and hypothesized that the area's historical economic development challenges are at least partially explained by the resource curse phenomenon. While coalmining is no longer a viable source of income for most communities in Central Appalachia, the industry's significance to the economy and, to a smaller extent, the region's culture can still be traced to present-day. The McDowell County case study proves that some counties still depend on resource extraction as a primary means of economic activity; these areas' failure to diversify and transition to other industries has undoubtedly contributed to their distressed status. My analysis also revealed that the resource curse explanation does not holistically describe Central Appalachia's present-day status. Low labor force participation rates and low education levels have long defined the region even in areas without coal-mining; however, bright spots have emerged based on the study of Harrison

and Chenango counties. Though neither county identified a panacea to economic decline, they have established strategic development plans to diversify their respective workforces: Harrison transformed itself into a fulcrum for government and medical employment, whereas Chenango expanded into advanced manufacturing and financial services to drive growth.

Central Appalachia's plight is not unique. The increasing popularity of renewable energy in the United States will have a profound impact on fossil-fuel towns across the country, from the shale fields of Pennsylvania to the oil fields of Texas. Consequently, my research design may have important implications for low-skill, low-income workers in rural Central Appalachia and potentially other resource-dependent regions of the United States. The intervention could contribute to the growing body of literature that suggests targeted job-training programs generate significant returns compared to other economic development initiatives (e.g., Federal Empowerment Zones) (Bahr *et al.*, 2015; Jepsen, Troske, and Coomes, 2014). The conditionality aspect of my proposal is designed to incentivize individuals to stay within Central Appalachia and to prevent the noted "brain drain." Ultimately, this intervention will provide important insight into place-based education policy's ability to unify a nation with hardening boundaries between high-skill, coastal cities and left-behind, Central Appalachia. Despite Central Appalachia's generally distressed status, the likes of Harrison and Chenango Counties prove the feasibility of transitioning from primary sectors of economic activity (mining, lumber, farming, etc.). As such, with the implementation of place-based, targeted programs, akin to the workforce development proposal discussed in this report, Central Appalachia may one day achieve economic parity with other parts of Appalachia and, more broadly, the Eastern Seaboard.

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